

Claims

1. A method of providing a reliable server function in support of a service or a set of services, such as internet-

5 based applications, the method comprising the following steps:

- forming a server pool (SP) with one or more pool elements (PE1, PE2), each of the pool elements (PE1, PE2) being capable of supporting the service/s,

10 - providing at least one name server (NS) for managing and maintaining a name space for the server pool (SP), the name space comprising a pool name identifying the server pool (SP),

- sending, by a pool user (PU) for making use of the service/s, a request to the name server (NS) indicating the pool name,

- resolving, by the name server (NS) upon request, the pool name to a Name Resolution List, the Name Resolution List comprising address information, such as IP address, related to one or more of the pool elements (PE1, PE2),

20 - sending the Name Resolution List by the name server (NS) to the pool user (PU),

- accessing, by the pool user (PU) and based on the address information from the Name Resolution List, one of the pool elements (PE1, PE2) of the server pool (SP) for making use of the service/s,

characterized by

sending status information related to the operational status of at least one of the pool elements (PE1, PE2) from the name server (NS) to the pool user (PU).

2. The method of claim 1,

characterized in that

the status information represents a timestamp indicating a

35 point of time at which the status of one of the pool elements (PE1, PE2) is determined.

3. The method of claim 2,
characterized in that
the status of said one of the pool elements (PE1, PE2) is de-
termined based on a Keep-Alive-Acknowledgement-Message re-
ceived by the name server (NS) from the one of the pool ele-
ments (PE1, PE2) in response to a Keep-Alive-Message sent by
the name server (NS) to the one of the pool elements (PE1,
PE2) or a local timer expiry notification at the name server
(NS) due to a missing Keep-Alive-Acknowledgement-Message from
one of the pool elements (PE1, PE2),
the Keep-Alive-Acknowledgement-Message and the local timer
expiry notification indicating the status of the one of the
pool elements (PE1, PE2), for example as being up and down,
respectively.

15 4. The method of claim 2 or 3,
characterized in that
the status information comprises a positive number, for exam-
ple representing the timestamp, if said one of the pool ele-
ments (PE1, PE2) is in an up-status and
the status information comprises a negative number, for exam-
ple representing the timestamp with a minus sign, if said one
of the pool elements (PE1, PE2) is in a down-status.

25 5. The method of any one of the preceding claims,
characterized in that
the sending of the request by the pool user (PU) to the name
server (NS) is performed by sending a name Resolution Mes-
sage, the sending being triggered within the pool user (PU)
30 to accomplish cache population.

6. The method of any one of the preceding claims,
characterized in that
sending the name Resolution List by the name server (NS) to
35 the pool user (PU) comprises sending a name Resolution Re-
sponse Message, which further comprises the status informa-

tion, whereby preferably the status information is inserted into the name Resolution Response Message as a status vector.

7. The method of any one of the preceding claims,

5 characterized in that a particular one of the pool elements (PE1, PE2) in the server pool (SP) is selected for the server function, based on the status information in the status vector received from the name server (NS).

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8. The method of any one of the preceding claims,

characterized in that the pool user (PU) determines a status vector comprising status information related to an availability of one or more 15 of the pool elements (PE1, PE2) and the status vector determined by the pool user (PU) is updated by the status vector received from the name server (NS).

9. The method of claim 8,

20 characterized in that the status information related to the availability is determined by the expiry or non-expiry of one or more timers related to message transmission between the pool user (PU) and the one or more of the pool elements (PE1, PE2) in the application 25 layer and/or transport layer.

10. The method of claim 8 or 9,

characterized in that the status vector determined by the pool user (PU) is updated 30 by replacing status information with corresponding status information of the status vector received from the name server (NS), in case the corresponding status information is indicated to be more up-to-date, for example the absolute value of a timestamp being higher.

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11. The method of any one of claims 7 to 10,

characterized in that

in selecting a particular one of the pool elements (PE1, PE2) in the server pool, by the pool user (PU) further a server selection policy is applied, in particular Maximum Availability SSP or one of its extensions.

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12. A name server (NS) for managing and maintaining a name space for a server pool (SP) with one or more pool elements (PE1, PE2) for providing a reliable server function in support of a service or a set of services, such as internet-based applications, the name server comprising
 - a pool resolution server module (10) to receive a request, preferably a name Resolution Message according to the IETF ASAP protocol, indicating the pool name, and
 - a memory (14) to store address information, such as IP address, related to the pool elements (PE1, PE2) associated to a pool name identifying the server pool (SP), the pool resolution server module (10) being adapted to resolve, in response to the request, the pool name to a name Resolution List by accessing the memory (14) and extracting the address information associated to the pool name thereof, and to assemble a message comprising the Name Resolution List, such as a Name_Resolution_Response-Message according to the IETF ASAP protocol, and to send the message to the sender (16) of the request,
- 25 characterized in that the memory (14) is further adapted to store status information associated to one or more of the pool elements (PE1, PE2) and the pool resolution server module (10) is further adapted to access, in response to the request, the memory (14) to extract the status information, and to send the status information back to the sender (16) of the request, preferably by inserting the status information into the message as a status vector.
- 35 13. The name server of claim 12, characterized by

an element status module (12) to assemble a Keep-Alive-Message, preferably an Endpoint_Keep_Alive-message according to the IETF ASAP Protocol, and to send the Keep-Alive-Message to one of the pool elements (PE1, PE2), and to receive a

5 Keep-Alive-Acknowledgement-Message or to receive a local timer expiry notification, preferably an Endpoint_Keep_Alive_Ack-message or a local timer expiry according to the IETF ASAP Protocol, from one of the pool elements (PE1, PE2) and, in response to this reception, to access the memory (14) to

10 write status information indicating the status of said one of the pool elements (PE1, PE2), preferably as being up and down, respectively.

14. The Name server of claim 13,

15 characterized in that the element status module (12) is adapted to write as the status information a number representing a timestamp.

15. A pool user device (PU) for making use of a server function in support of a service or set of services, for example internet-based applications, which can be provided by each one of one or more pool elements (PE1, PE2) of a server pool (SP), the pool user device comprising

20 - a pool resolution client module (16) to assemble a request, preferably a Name_Resolution-Message according to the IETF ASAP protocol, indicating a pool name identifying the server pool (SP), to send this request to a name server (NS) and to receive a message comprising a name resolution list, preferably a Name_Resolution_Response-Message according to the IETF

25 ASAP protocol from the name server (NS),

30 - a server selection module (18) to access, based on address information from the name resolution list, a particular one of the pool elements (PE1, PE2) of the server pool (SP) for making use of the service/s,

35 characterized in that the pool resolution client module (16) is further adapted to receive the message comprising a status vector and

the server selection module (18) is further adapted to access the particular one of the pool elements (PE1, PE2) in response to status information included in the status vector.

5 16. The pool user device of claim 15,
characterized by
a memory (20) to store status information, preferably a
status vector, the pool resolution client module (16) and the
server selection module (18) being adapted to write and read,
10 respectively, the status information.

17. The pool user device of claim 16,
characterized by
a server availability module (22) to determine status information related to an availability of one or more of the pool elements (PE1, PE2) and to access the memory (20) to write
15 the status information thereto.

18. The pool user device of claim 17,
20 characterized in that
the server selection module (18) is adapted to update the status vector written by the server availability module (22) to the memory (20) by the status vector received by the pool resolution client module (16).
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19. The pool user device of any one of claims 15 to 18,
characterized in that
in selecting a particular one of the pool elements (PE1, PE2) in the server pool (SP), by the server selection module (18)
30 further a server selection policy is applied, in particular Maximum Availability SSP or one of its extensions.